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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,634	12/26/2003	Carles Borrego Bel	8134ES	1633

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EXAMINER	
CARPIO, IVAN HERNAN	
ART UNIT	**PAPER NUMBER**
2841	

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/707,634	BORREGO BEL ET AL.	
	Examiner	Art Unit	
	Ivan H. Carpio	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-11 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-11 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 12-26-03 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 12-26-03
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 –10 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuji (US Patent 6158232).

With respect to claim 1 Tsuji teaches a printed circuit board (Fig. 1b) with insulated metal substrate with integrated cooling system, of the type comprising a metal substrate (Fig. 1b, element 5), at least one electrically insulating layer (Fig. 1b, element 1) adhered to said metal substrate and several electro-conducting tracks (column 3, line 14) capable of interconnecting electronic power components (Fig. 1b, element 2), adhered to said electrically insulating layer, characterized in that said metal substrate incorporates several heat transporting channels (Fig. 1b, element 7), which comprise several conduits for a heat-carrying fluid (Fig.1b, element 6), conduits which extend to the outside (Fig. 1a, element 4) of the metal substrate up to a heat transfer area to an external medium.

With respect to claim 2 and with all the limitations of claim 1, Tsuji teaches that said conduits are conduits for said heat-carrying fluid in close contact with the walls of several cavities (Fig. 1a, element 7) formed in the material of the metal substrate in a direction that is substantially parallel to said electrically insulating layer, said conduits

protruding at least on one edge (Fig.1a, element 4) of the metal substrate and extending on one portion until reaching said heat transfer area.

With respect to claim 3 and with all the limitations of claim 2, Tsuji teaches that said heat-carrying fluid conduits are heat pipes that are closed on both ends (Fig. 1a, element 4) and partially full of heat-carrying fluid, with an evaporation region (Fig. 1a, element 5, Note if the component (2) heats up sufficiently it will cause the water inside the metal substrate (5) to evaporate) inside of the metal substrate and an external condensation region (Fig. 1a, element 4) extending with an inclination a distance outside of the metal substrate and which is in contact with the circulating air.

With respect to claim 4 and with all the limitations of claim 2, Tsuji teaches that that said cavities (Fig.1a, element 7) are through cavities.

With respect to claim 5 and with all the limitations of claim 1, Tsuji teaches that that said conduits comprise several cavities placed in a direction that is substantially parallel to said electrically insulating layer, at least one of the ends of each one of said cavities opening into an opening located on at least one edge of the metal substrate, whose opening is coupled with a span of a pipe (Fig. 1a, element 4) for said heat-carrying fluid extending up to said heat transfer area.

With respect to claim 6 and with all the limitations of claim 5, Tsuji teaches that that each one of the cavities has a blind end (Fig. 1a, right end) and has only one opening on one of the edges of the metal substrate in which said span of pipe is coupled (Fig. 1a, element 4) which is provided with a blind distal end, the cavity and pipe assembly constituting a heat pipe in which the cavity performs the functions of an

evaporation region inside of the substrate and the span of pipe performs the functions of a condensation region in contact with the circulating air.

With respect to claim 7 and with all the limitations of claim 6, Tsuji teaches that the opening have a countersink opening (Fig. 1b, element 7) for receiving the ends of the respective spans of pipe (Fig. 1a, element 4)

With respect to claim 8 and with all the limitations of claim 2, Tsuji teaches that said cavities have a circular cross section (Fig. 1b).

With respect to claim 9 and with all the limitations of claim 2, Tsuji teaches that said cavities (Fig. 4b) have a polygonal cross section.

With respect to claim 10 and with all the limitations of claim 4, Tsuji teaches that said cavities are parallel (Fig. 1b) to each other and have a longitudinal opening along its entire extension opening onto a side of the metal substrate that is opposite the side thereof on which said electrically insulating layer and electro-conducting tracks are fixed, such that the metal substrate has a cross section shape that is suitable for easily being obtained by extrusion.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuji in view of Schlaiss (US Patent 5929518).

With respect to claim 11, Tsuji teaches all of the limitations including a metal substrate with cavities. Tsuji does not teach that the substrate comprises two layers that are joined together and that the cavities are formed by the juxtaposition of two semi-cavities found respectively on each one of the layers. Schlaiss teaches a two-layer substrate (Fig. 1, elements 12 and 13) that are joined together and that the cavities are formed by the juxtaposition of two semi-cavities found respectively on each one of the layers. It would have been obvious tone of ordinary skill in the art at the time of the inventions to form the substrate, taught by Tsuji, by the method taught by Schlaiss, because doing so allows the cavity to be cleaned and or fixed with ease by simply opening up the substrate when needed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ivan H. Carpio whose telephone number is 571-272-8396. The examiner can normally be reached on M-R 6:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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